IN THE CLAIMS:

Please enter the following amended claims:

1. (currently amended) A method for resolving cell placement overlaps in an integrated circuit comprising the steps of:

a) ~~determining~~ assessing an initial placement of the cell~~s~~ having overlapping cells;

b) capturing a view of the placement including blockage-space and free-space to define ~~in an image space~~ physical regions in an image space of the integrated circuit, wherein the image space physical regions capture a two-dimensional distribution of the free-space, blockage space and placement of the cells;

c) constructing a network flow model representing a ~~the~~ movement of the cells between the physical regions, simultaneously in the two physical dimensions of the integrated circuit layout;

d) solving the network flow model to determine a desired flow of the cells between the physical regions of the integrated circuit; and

e) ~~realizing the best approximation of the desired flow of cells~~ moving the plurality of cells simultaneously across physically neighboring regions based on the desired flow between the regions.

Please cancel claim 2 without prejudice.

3. (original) The method as recited in claim 1, wherein in step b) the physical regions defined in the image space are placement-aware to facilitate physically realizable global solutions and avoid unnecessary movement of the cells across the physical regions.

4. (original) The method as recited in claim 1, wherein in step c) the network flow model represents a required global area migration across the image space to satisfy area capacity-demand constraints.

Please cancel claim 5 without prejudice.

6. (original) The method as recited in claim 1, wherein step e) further comprises the steps of:

(e1) selecting the cells from each physical region to satisfy the desired flows in each direction with a minimum cost;

(e2) physically moving the cells between the physical regions; and

(e3) updating the desired flows locally based on an unrealized flow value.

7. (original) The method as recited in claim 6, wherein in step e1) the selection of cells from each physical region is modeled as a generalized network flow model.

8. (original) The method as recited in claim 6, wherein in step e1) the cells to be moved from one physical region to all neighboring regions based on the desired flow directions are selected simultaneously to minimize the total cost.

9. (original) The method as recited in claim 6, wherein in step e1) an approximation algorithm is provided for selecting the cells from one physical region to be moved with minimum cost.

10. (original) The method as recited in claim 6, wherein in step e1) the cost of the cell movements is computed by executing a method selected from the group consisting of:

quadratic movement cost, linear movement cost, timing sensitivity or criticality, linear wirelength change and pin congestion measure.

11. (original) The method as recited in claim 6, wherein in step e2) the cells are moved to target regions while determining a detailed physical location of the cells that are moved.

12. (original) The method as recited in claim 11, wherein the cells are placed at the closest physical location in the target region from the original region using ripple-slide operation to resolve local overlaps resulting thereof.

13. (original) The method as recited in claim 6, wherein in step e2) the regions are dynamically resized to accommodate the horizontal movement of the cells.

14. (original) The method as recited in claim 6, wherein in step e3) the desired flows from the target regions are locally updated to account for excess assignments resulting from discrete cell sizes.

15. (currently amended) The method as recited in claim 1, further comprising the steps of

(f) updating ~~the global~~ a network flow model by iterating steps (d) and (e) to converge to a solution that satisfies all capacity-demand constraints.

(g) providing a local re-ordering of the cells to minimize a linear wirelength metric; and

(h) approximately modeling the movement of multi-row high cells using an augmented network flow model.

16. (original) The method as recited in claim 15, wherein in step g) the new position of the cells is achieved by swapping cells within a local region to minimize the linear wirelength.

17. (original) The method as recited in claim 15, wherein in step h) the augmented network flow graph approximately models the presence and the movement of multi-row high cells along with single-row high cells.

18. (currently amended) The method as recited in step h) of claim 15, further comprising the steps of:

h1) solving the ~~global~~ augmented network flow model to include multi-row high cells;

h2) pre-placing multi-row high cells at a an initial location based on a global solution; and

h3) executing steps (b) through (e) to legalize the single-row high cells.

19. (original) The method as recited in claim 15, wherein in step e1) the cost of cell movement in the general framework is computed by executing a method selected from the group consisting of: quadratic movement cost, linear movement cost, timing sensitivity or criticality, linear wirelength change and pin congestion measure.

20. (currently amended) A program storage device readable by a machine, tangibly, embodying a program of instructions executable by the machine to perform method steps for performing static timing analysis of a digital system in the presence of a plurality of global sources of delay variation, said method steps comprising:

a) ~~determining~~ assessing an initial placement of the cells having overlapping cells;

b) capturing a view of the placement including blockage-space and free-space to define ~~in an image space~~ physical regions in an image space of the integrated circuit, wherein the image space physical regions capture a two-dimensional distribution of the free-space, blockage space and placement of the cells;

c) constructing a network flow model representing a ~~the~~ movement of the cells between the physical regions, simultaneously in the two physical dimensions of the integrated circuit layout;

d) solving the network flow model to determine a desired flow of the cells between the physical regions of the integrated circuit; and

e) ~~realizing the best approximation of the desired flow of cells~~ moving the plurality of cells simultaneously across physically neighboring regions based on the desired flow between the regions.

21. (new) A method for resolving cell placement overlaps in an integrated circuit layout comprising the steps of:

a) creating a network flow graph of an initial placement that includes cell overlaps for modeling a movement of a plurality of cells simultaneously in two physical dimensions, both across and within circuit rows of the integrated circuit layout;

b) solving the network flow graph for computing a desired migration of cell-area across the integrated circuit layout from regions with the overlapping cells to regions with free-space;

c) evaluating the direction and amount of cell-area to be migrated between physically neighboring regions in a two-dimensional image, based on the network flow graph solution;

d) simultaneously moving the plurality of cells across physically neighboring regions based on the evaluated direction and area migration flow between the physically neighboring regions;

e) analyzing the physical regions for overlap detection by verifying the total cell area in each physical region to be less than or equal to its physical capacity limit; and

f) repeating steps a) through e) until the cell overlaps has been resolved or a predetermined number of iterations has been completed.